





# **GRE GENERAL RESEARCH OF ELECTRONICS, INC.**

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## S P E C I F I C A T I O N S

SUBJECT : VHF/UHF AM-FM PROGRAMMABLE SCANNING RECEIVER WITH TUNING KNOB  
(EUROPEAN MODEL) AE100T

### 1. GENERAL

- 1 Programmable channel : 500 Memory channels (50 channels x 10 banks)
  - 10 Limit search bank
  - 50 Monitor channels
  - 10 Priority channels
  - 23 Bands search
  
- 2 Receiving system : PLL synthesizer triple conversion superheterodyne
  - 1st IF 225.4125-225.5875, 226.4125-226.5875,  
604.905-605, 610.905-611,  
611.905-612.0875 and 612.905-613MHz )
    - : the 1st Local OSC frequency employs upper side (approx. 612MHz) of receiving frequency range (25-450MHz).
    - : the 1st Local OSC frequency employs upper side (approx. 226.5MHz) of receiving frequency range (450.0125-848.9875MHz).
    - : the 1st Local OSC frequency employs lower side (approx. 226.5MHz) of receiving frequency range (849-1250MHz).
    - : the 1st Local OSC frequency employs lower side (612MHz) of receiving frequency range (1250.0125-1300MHz).
  - 2nd IF (45MHz)
    - receiving frequency range 25-450MHz and 1250.0125-1300MHz
      - : the 2nd Local OSC frequency employs 45MHz lower side of 1st IF (approx. 612MHz)
    - receiving frequency range 450.0125-1250MHz
      - : the 2nd Local OSC frequency employs 45MHz upper side of 1st IF (approx. 226.5MHz)

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## **PRODUCT DEVELOPMENT & MANUFACTURING**

3rd IF (10.7MHz) for WIDE FM

: the 3rd local OSC frequency employs lower side of 2nd IF

3rd IF (455kHz) for NARROW FM and AM

: the 3rd local OSC frequency employs lower side of 2nd IF

- 3 Receiving wave mode : WIDE FM (FM broadcast)  
NARROW FM (Business, communication, ham radio)  
AM (Aircraft)
- 4 Frequency range and Mode
- |                          | <u>Freq.</u> (MHz)   | <u>Step</u> | <u>Mode</u> (Default) |
|--------------------------|--|-------------|-----------------------|
| 4-1) Frequency, step and | 25.0000- 87.4950   | 5.0kHz      | NFM                   |
|                          | 87.5000- 107.9500  | 50.0kHz     | WFM                   |
|                          | 108.0000- 136.9750   | 25.0kHz     | AM                    |
|                          | 137.0000- 143.9950   | 5.0kHz      | NFM                   |
|                          | 144.0000- 146.0000   | 12.5kHz     | NFM                   |
|                          | 146.0050- 224.9950   | 5.0kHz      | NFM                   |
|                          | 225.0000- 399.9875   | 12.5kHz     | AM                    |
|                          | 400.0000-1300.0000   | 12.5kHz     | NFM                   |
| 4-2) Band search         | 26-28, 28-30, 31-32, 46-47, 50-54, 70-84,<br>84-87.495, 87.5-107.95, 108-118, 118-136.975,<br>144-146, 153-154, 154-155, 156-163, 163-174,<br>230-330, 430-440, 460-466, 466-469, 930-932,<br>935-939, 959-960, 1240-1300MHz |             |                       |
- 5 Scanning rate : 40 channels/sec.
- 6 Searching rate : 75 steps/sec.
- 7 Attenuator : Approx. 20dB from 25MHz to 500MHz, approx. 15dB from 500MHz to 1300MHz
- 8 Frequency, Mode and S-Meter: LCD with backlighting
- 9 Zeromatic : Activates during search mode.
- 10 Audio output : 1.3W nominal
- 11 Speaker : Built-in 77mm 8 ohms Dynamic speaker
- 12 Operating Voltage and power consumption : 220-240V AC 50Hz 12W or DC 13.8V, 400mA

- 13 Dimension : Approx. 232 (W) x 210 (D) x 90 (H) mm
- 14 Weight : Approx. 2kg without antenna
- 15 Accessory : Telescopic antenna and Owner's manual
- 16 Memory backup : Rechargeable lithium battery

## 2. ELECTRICAL

- 1 Frequency coverage : 25.0000-1300.0000MHz

-2 Sensitivity		<u>Nominal</u>	<u>Limit</u>
NFM : (S+N)/N=20dB	: 25MHz- 500MHz	0.5 $\mu$ V	2 $\mu$ V
DEV. : 3kHz at 1kHz	500.0125MHz-1000MHz	1 $\mu$ V	3 $\mu$ V
	1000.0125MHz-1300MHz	2 $\mu$ V	5 $\mu$ V
AM : (S+N)/N=20dB	: 25MHz- 500MHz	2 $\mu$ V	5 $\mu$ V
MODE: 60% at 1kHz	500.0125MHz-1000MHz	3 $\mu$ V	10 $\mu$ V
	1000.0125MHz-1300MHz	5 $\mu$ V	20 $\mu$ V
WFM : (S+N)/N=30dB	: 25MHz- 500MHz	3 $\mu$ V	10 $\mu$ V
DEV. : 45kHz at 1kHz	500.0125MHz-1000MHz	3 $\mu$ V	10 $\mu$ V
	1000.0125MHz-1300MHz	5 $\mu$ V	20 $\mu$ V

- 3 Image ratio

1st IF Image	: VHF Low at 30MHz	65dB	50dB
	30MHz + (2 x 612MHz) = 1254MHz		
	Aircraft at 126MHz	65dB	50dB
	126MHz + (2 x 612MHz) = 1350MHz		
	VHF High at 150MHz	65dB	50dB
	150MHz + (2 x 612MHz) = 1374MHz		
	UHF Low at 400MHz	50dB	Not specified
	400MHz + (2 x 612MHz) = 1624MHz		
	UHF High at 760MHz	40dB	Not specified
	760MHz + (2 x 226.5MHz) = 1213MHz		
	UHF High at 1000MHz	30dB	Not specified
	1000MHz - (2 x 226.5MHz) = 547MHz		

		<u>Nominal</u>	<u>Limit</u>
2nd IF Image	: VHF High at 150MHz 612MHz - (2 x 45MHz) = 522MHz	70dB	50dB
	UFH High at 760MHz 226.5MHz + (2 x 45MHz) = 316.5MHz	70dB	50dB
-4 Squelch sensitivity			
NFM and AM Threshold	: 25MHz - 500MHz 500.0125MHz - 1000MHz 1000.0125MHz - 1300MHz	0.5 $\mu$ V 0.5 $\mu$ V 3 $\mu$ V	2 $\mu$ V 2 $\mu$ V 10 $\mu$ V
Tight: (S+N)/N	25MHz - 500MHz 500.0125MHz - 1000MHz 1000.0125MHz - 1300MHz	25dB 25dB 25dB	15dB 15dB 15dB
WFM Threshold	: 25MHz - 500MHz 500.0125MHz - 1000MHz 1000.0125MHz - 1300MHz	3 $\mu$ V 3 $\mu$ V 15 $\mu$ V	10 $\mu$ V 10 $\mu$ V 30 $\mu$ V
Tight: (S+N)/N	25MHz - 500MHz 500.0125MHz - 1000MHz 1000.0125MHz - 1300MHz	50dB 50dB 50dB	30dB 30dB 30dB
-5 Selectivity			
NFM	: -6dB -50dB	$\pm$ 10kHz $\pm$ 20kHz	$\pm$ 14kHz $\pm$ 25kHz
AM	: -6dB -50dB	$\pm$ 6kHz $\pm$ 12kHz	$\pm$ 10kHz $\pm$ 20kHz
WFM	: -6dB -50dB	$\pm$ 150kHz $\pm$ 300kHz	$\pm$ 200kHz $\pm$ 400kHz
-6 Spurious rejection (Except primary image)	: at 400MHz (NFM)	40dB	30dB
-7 IF rejection	: 612MHz at 400MHz 226.5MHz at 760MHz 45MHz at 400MHz	60dB 70dB 100dB	40dB 40dB 60dB
-8 Acceptable radio frequency displacement (EIA RS-204D)			
NFM at 400MHz	: kHz	$\pm$ 6kHz	$\pm$ 3kHz

## -9 Signal to noise ratio

			<u>Nominal</u>	<u>Limit</u>	
AM and FM					
	RF input 100 $\mu$ V	:	25MHz - 500MHz	40dB	30dB
	DEV. 3kHz at 1kHz		500.0125MHz - 1000MHz	40dB	30dB
	MOD. 60% at 1kHz		1000.0125MHz - 1300MHz	40dB	30dB
WFM					
	RF input 100 $\mu$ V	:	25MHz - 500MHz	50dB	40dB
	DEV. 45kHz at 1kHz		500.0125MHz - 1000MHz	50dB	40dB
			1000.0125MHz - 1300MHz	50dB	40dB
-10	Residual noise	:		1mV	3mV
	(Vol. Min., Squelched)				
-11	Birdies and stop frequency	:	Under discussion		
	when search				
-12	Scanning rate	:	40 channels/sec. 15-50 channels/sec.		
-13	Search rate	:	75 steps/sec. 3-85 steps/sec.		
-14	Automatic memory rate	:	20 steps/sec. 2-22 steps/sec.		
-15	Priority sampling	:	2sec. 1-3sec.		
-16	Scan delay time	:	2sec. 1-3sec.		
-17	Attenuator	:	25MHz - 500MHz	20dB	15-25dB
			500.0125MHz - 1300MHz	15dB	10-20dB
-18	Signal meter				
	NFM	:	S-1	(S+N)/N = 15dB	Not specified
			S-FULL	(S+N)/N = 30dB	Not specified
	AM	:	S-1	(S+N)/N = 10dB	Not specified
			S-FULL	(S+N)/N = 25dB	Not specified
	WFM	:	S-1	(S+N)/N = 40dB	Not specified
			S-FULL	(S+N)/N = 55dB	Not specified
-19	Audio max. power	:	AC 230V 50Hz	2.0W	1.5W
	RF input 100 $\mu$ V at 400MHz		DC 13.8V	1.7W	1.3W
	DEV.: 3kHz at 1kHz				
	LOAD: 8 ohms				

			<u>Nominal</u>	<u>Limit</u>
-20	Audio output power : AC 230V 50Hz at T.H.D. 10% DC 13.8V		1.6W 1.3W	1.2W 1.0W
-21	T.H.D. at 0.5 watt output : power		2%	5%
-22	Headphone max. output power:			
	RF input 100 $\mu$ V at 400Hz DEV.: 3kHz at 1kHz			
	8 $\Omega$ mono/stereo (each phone) AC 230V 50Hz		5.5mW/5.3mW	8.8mW
	16 $\Omega$ mono/stereo (each phone) AC 230V 50Hz		11.5mW/10.3mW	18.5mW
	32 $\Omega$ mono/stereo (each phone) AC 230V 50Hz		19.5mW/15.3mW	31mW
	64 $\Omega$ mono/stereo (each phone) AC 230V 50Hz		31mW/20.5mW	49mW
	8 $\Omega$ mono/stereo (each phone) DC 13.8V		4.5mW/4.1mW	7.2mW
	16 $\Omega$ mono/stereo (each phone) DC 13.8V		9.1mW/8.0mW	14.5mW
	32 $\Omega$ mono/stereo (each phone) DC 13.8V		15.3mW/12.2mW	25mW
	64 $\Omega$ mono/stereo (each phone) DC 13.8V		24.4mW/16.2mW	40mW
-23	Tape output			
	NFM : NFM DEV.: 3kHz at 1kHz		540mV	300mV
	AM : AM MODE: 60% at 1kHz		510mV	300mV
	WFM : WFM DEV.: 45kHz at 1kHz		590mV	300mV
	RF input: 100 $\mu$ V LOAD : 10k ohms			
-24	Audio frequency response : NFM/AM/WFM at -6dB		300Hz 2.0kHz	200-400Hz 1.5-3kHz
-25	Memory holdtime :		3 months	2.5 months

(Requires at least 4 days connection to the AC or DC power supply)



- 26 Intermediate frequency : 1st 225.4125-225.5875MHz  
226.4125-226.5875MHz  
604.905 -605.000MHz  
610.905 -611.000MHz  
611.905 -612.0875MHz  
612.905 -613.000MHz  
2nd 45MHz  
3rd 10.7MHz at WFM MODE  
455kHz at NFM and AM MODE
- 27 Filter : Monolithic crystal filter for 45MHz  
Ceramic filter for 10.7MHz and 455kHz
- 28 Antenna impedance : 50 ohms
- 29 Temperature range : Test to specification between: +18°C - +35°C  
Operate (Need not meet spec.): 0°C - +43°C

### 3. OPERATING CONTROLS AND CONNECTIONS

- 1 Volume control with rotary type power switch
- 2 Tuning knob
- 3 Squelch control
- 4 Keyboard (29 Keys)
- 5 8 digit frequency display by LCD
- 6 3 digit channel indicator by LCD
- 7 Indicator : ▲, ▼, SCAN, MANUAL, SEARCH, PROGRAM, AUTO, AM, FM, WFM, CH, TUNE, DELAY, LOCK-OUT, PRIORITY, BANK, MONITOR, ATT, Signal meter and ERROR
- 8 BNC type antenna connector
- 9 Headphone jack (D=3.5mm stereo)
- 10 DC power connector
- 11 External speaker jack
- 12 Tape out connector (RCA type)
- 13 Remote control connector for Tape recorder
- 14 20dB attenuator (keyboard)
- 15 AC power cord

### 4. FEATURES

- 1 500 memory channels
- 2 10 banks for channel grouping
- 3 10 limit search bank
- 4 Changes receiving frequencies by the tuning knob

- 5 Changes manual, program by the tuning knob
- 6 Changes Limit search banks and Band search by the tuning knob
- 7 23 bands search
- 8 Direct search
- 9 50 monitor temporary memories
- 10 500 channels automatic scanning for VHF to UHF and AIR band [cleared channels (000.000 freq.) are not scan]
- 11 40 channels/sec. scanning rate and 75 steps/sec. searching rate
- 12 Automatic memory function of receiving frequencies
- 13 Shows alarm for preventing duplicate frequencies
- 14 Lock-out frequencies (maximum 200 frequencies on search mode)
- 15 Built-in 10 priority channels
- 16 Built-in electrical channel lock-out circuit
- 17 Lock out channel review and lock-out frequencies review
- 18 Built-in electrical scan delay circuit
- 19 Change the direction at the manual scan and searching by ▲ or ▼
- 20 Zeromatic tuning system
- 21 Direct access to over 117,000 frequencies
- 22 Manual selection for channel
- 23 Sort all the frequencies within bank in the ascending or descending order
- 24 Moving frequencies from banks to monitor memory
- 25 Deleting a frequencies from a channel or monitor memory
- 26 Deleting frequency from locked-out within a bank
- 27 Deleting all frequencies from channels within a bank
- 28 11 digit display for channel and frequency with all function indicators
- 29 LCD back-lighting
- 30 Headphone jack (D=3.5mm)
- 31 BNC antenna connector
- 32 Tape-out connector
- 33 Crystal filter for 45MHz 2nd IF and Ceramic filter for 10.7MHz (WFM), 455kHz (AM, NFM) 3rd IF section
- 34 Regulated DC power supply circuit
- 35 Built-in dynamic speaker
- 36 Automatic switching for AM, FM or WFM reception
- 37 Changeable for AM, FM or WFM reception
- 38 Signal meter on LCD
- 39 Attenuator control
- 40 Remote control output for tape recorder